ii. Kicker Magnet Requirements and Design

A series of five H-core magnets constructed of Ceramics Magnetics CMD5005 ferrite will be employed in each of the RHIC abort kicker modules. Details of a single magnet assembly are shown in Fig. 6-5 The aperture of the magnets will be 50.8 mm horizontal ×76.2 mm vertical (2×3 in.) as shown in Fig. 6-6. To produce the nominal minimum magnetic field of 0.22 T, a magnet current of 13.3 kA will be required. Finite element analysis has been performed on the magnet showing a field uniformity of better than 5% over the full aperture of the magnet. The magnets will be located in a common vacuum enclosure (refer to Fig. 6-7) which will operate at ring pressures, the required vacuum levels being maintained by six sputter ion pumps placed atop the vacuum chamber structure. Table 6-1 summarizes the parameters for the RHIC abort kicker magnet.

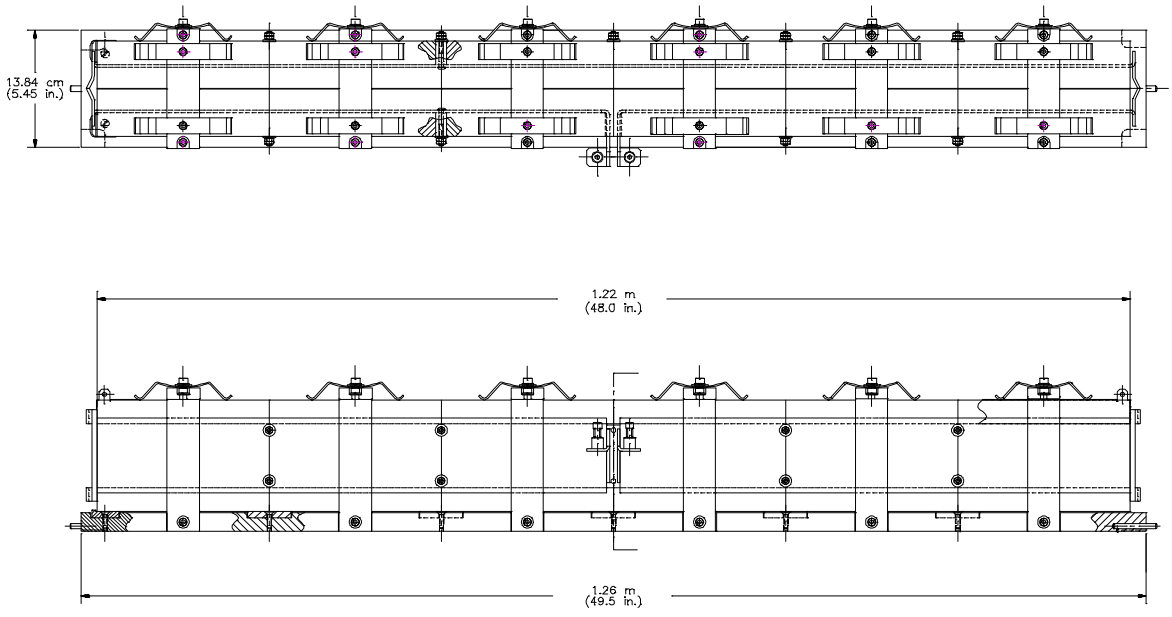

Fig. 6-5. Kicker magnet details.

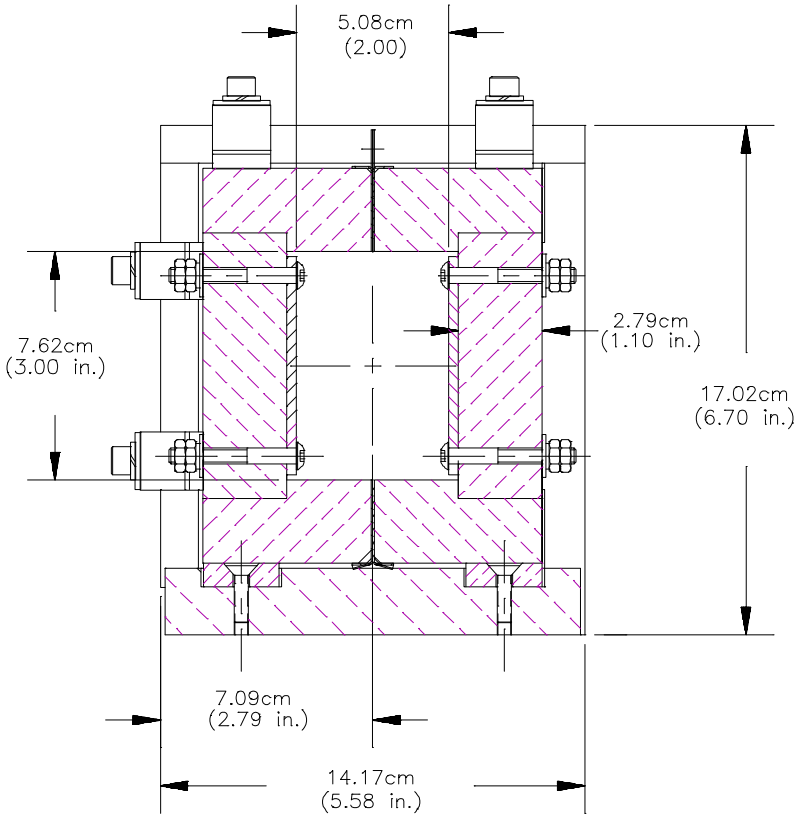

Fig. 6-6. Kicker magnet cross section.

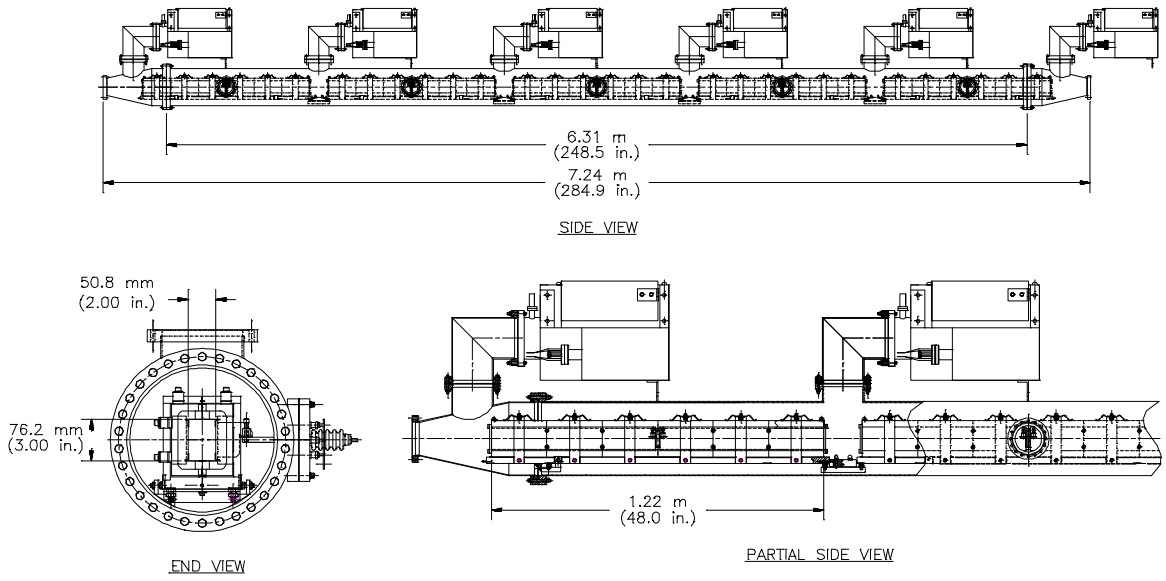

Fig. 6-7. Kicker magnet vacuum enclosure.

Table 6-1. Abort Kicker Magnet Requirements

Requirement	Value
Aperture (H×V)	50.8×76.2 mm (2×3 in.)
Length, each magnet	1.22 m (48 in.)
Number of magnets	5
Nominal minimum magnetic field @ top beam energy	0.22 T
Nominal kicker current	13.3 kA
Field uniformity, (full aperture)	<5%
Inductance, each kicker	1.06 μH
Magnetic field in ferrite @ 20.2 kA	0.3 T
Core material	Ceramic Magnetics CMD5005